N-TRON
THE INDUSTRIAL NETWORK COMPANY

9000

The *N-TRON*® *9000* Series Gigabit Ethernet Capable Industrial Ethernet Switch offers outstanding performance and ease of use. It is ideally suited for connecting Ethernet enabled industrial and/or security equipment and is a fully managed switch.

PRODUCT FEATURES

- Four Slot Modular Switch
- Six Port 10/100BaseTX Modules
- Two and Four Port 100BaseFX Modules
- Two Optional 1000BaseSX Ports, LC Style
- Fiber Optic Ring Manager with ~ 30ms Healing
- Full SNMP and Web Browser Management with Detalied Ring Map and Fault Location Charting
- N-View™ OPC Monitoring with Fault Status for Ring Managers
- Full IEEE 802.3 and 1613 Compliance
- NEMA TS1/TS2 Compliance
- American Bureau of Shipping (ABS) Type Approval
- Extended Environmental Specifications
- Auto Sensing 10/100BaseTX, Duplex, and MDIX
- Store-and-forward Technology
- Rugged DIN-Rail Enclosure
- Redundant Power Inputs (10-30 VDC)

Fully Managed Features:

- IGMP Snooping
- VLAN
- QoS
- Trunking
- Mirroring
- 802.1w Rapid Spanning Tree Protocol
- DHCP
- *N-TRON* N-Ring™ Technology

Management Features

The *9000* Series offers several management functions that can be easily configured using a Web Browser, Telnet or a COM port.

IGMP Snooping - Internet Group Management Protocol is a feature that allows the *9000* Series switch to forward and filter multicast traffic intelligently.

VLAN - Virtual Local Area Network allows you to segment the switch in order to create two or more separate local area network domains.

QoS - Quality of Service provides proioritization of network traffic in order to provide better network service. The primary goal of QoS is to improve the latency of prioritized Ethernet packets required for ring management, real-time, and other interactive applications.

Trunking - Trunking (Link Aggregation) enables multiple physical ports to be linked together and function as one uplink to another *N-TRON* trunking capable switch configured in the same manner, thereby increasing the bandwidth between switches. This configuration can provide increased bandwidth and redundancy to applications requiring high levels of fault tolerant operation.

Port Mirroring - This function allows the traffic on one port to be duplicated and sent to a designated mirror port. Port mirroring can be used to monitor Ethernet traffic on the designated source port using the assigned mirror port.

Rapid Spanning Tree - This function allows the switch to be configured in a Ring or Mesh topology, and provides support for redundant path communications with high speed (rapid) healing.

Remote Monitoring Options
For ease of configuration and monitoring the *9000* Series offers Web Browser Management and N-View OLE for Process Control (OPC) Server Software. The *N-TRON* N-View Software can be combined with popular HMI software packages to add network traffic monitoring, trending, and alarming to any application using *N-TRON* switches. In addition, SNMP, COM port, and Telnet interfaces are available for switch link and status monitoring.

N-Ring Technology
N-TRON's 9000 Series Ring Manager using *N-TRON's N-Ring* technology offers expanded ring size capacity, detailed fault diagnostics, and a standard healing time of ~30ms. The *9000* Series Ring Manager periodically checks the health of the Ring via packets. If the Ring Manager stops receiving these health check packets, it times out and converts the Ring to a fiber optic backbone within ~30ms. In addition to standard Ring Manager protocol, when using all *N-TRON* fully managed switches in the ring, a detailed ring map and fault location chart will also be provided on the Ring Manager's web browser and OPC Server to identify the health status of the ring. Up to 250 fully managed or 50 unmanaged monitored *N-TRON* switches can participate in *N-Ring* topology.

Industrial Packaging and Specifications
The *N-TRON 9000* Series is designed to operate in industrial environments. It is housed in a rugged steel DIN-Rail enclosure. It has extended industrial specifications and features to meet or exceed the specifications of the equipment it is connecting. These include extended temperature ratings, extended shock and vibrations specs, redundant power inputs, and high MTBF (greater than 1M hours).

Ease of Use and Performance
The 10/100BaseTX ports are auto sensing and auto configuring. Each copper port is automatically negotiated for maximum speed and performance by default, but can also be hard coded using the user interface. The two GB fiber optic ports support full 2000 Mb/s communications via 1000BaseSX. LED's are provided to display the link status, and activity of each port as well as power on/off status.
A high speed processor and backplane allows wire speed capability on all 100BaseTX and 100Base FX ports simultaneously.

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9000 Series Industrial Ethernet Switch Ordering Information

9000BP	5 Slot Backplane
9000CPU	CPU Module
9002CPU-SX	CPU Module with Two Multimode GB Fiber Optic Ports
9002CPU-LX-ZZ	CPU Module with Two Singlemode GB Fiber Optic Ports
9006TX	Six Port 10/100BaseTX Copper Module
9002FXE-XX-YY	Two Port 100BaseFX Fiber Ports
9004FXE-XX-YY	Four Port 100BaseFX Fiber Ports

Where: ZZ = 10, 40, 70 for GB Singlemode
E = Singlemode, and Blank Otherwise
XX = ST or SC, YY = 15, 40, or 80 for Singlemode, Blank for Multimode

Specifications

Switch Properties

Number of MAC Addresses:	4,096
Aging Time:	Programmable
Latency Typical:	2.9 μs
Backplane Speed:	6.6 Gb/s
Switching Method:	Store-and-Forward

Physical

Height:	5.10"	(12.95cm)
Width:	8.98"	(22.81cm)
Depth:	5.5"	(13.21cm)
Weight (max):	~5 lbs	(2.27kg)
DIN-Rail Mount:	35mm	

Electrical

Redundant Input Voltage:	10-30 VDC
Input Current (max):	2.5A@24V (fully populated)
Inrush @ 24V:	16.0 Amp for 7.5ms
N-TRON Power Supply:	NTPS-24-5 (5 Amp@24V)

Environmental

Operating Temperature:	-20°C to 70°C
Storage Temperature:	-40°C to 85°C
Operating Humidity:	10% to 95% (Non Condensing)
Operating Altitude:	0 to 10,000 ft.

Shock and Vibration (bulkhead mounted)

Shock:	200g @ 10ms
Vibration/Seismic:	50g, 5-200Hz, Triaxial

Reliability

MTBF:	>1 Million Hours

Network Media

10BaseT:	>Cat3 Cable
100BaseTX:	>Cat5 Cable
100BaseFX, 1000BaseSX	
Multimode:	50-62.5/125μm
100BaseFXE, 1000BaseLX	
Singlemode:	7-10/125μm

100 Mb Fiber Transceiver Characteristics

Fiber Length	*2km**	*15km***	*40km***	*80km***
TX Power Min	*-19dBm*	*-15dBm*	*-5dBm*	*-5dBm*
RX Sensitivity Max	*-32dBm*	*-29dBm*	*-34dBm*	*-34dBm*
Wavelength	*1310nm*	*1310nm*	*1310nm*	*1550nm*

* Multimode Fiber Optic Cable
** Singlemode Fiber Optic Cable

Gigabit Fiber Transceiver Characteristics

Fiber Length	*550m for 50/125μm** *300m for 62.5/125μm**	*10km***	*40km***	*70km***
TX Power Min	*-9.5dBm*	*-5dBm*	*-4dBm*	*-3dBm*
RX Sensitivity Max	*-17dBm*	*-20dBm*	*-21dBm*	*-23dBm*
Wavelength	*850nm*	*1310nm*	*1550nm*	*1550nm*
Assumed Fiber Loss	*- 3.5 to -3.75 dB/km*	*-0.5 dB/km*	*-0.25 dB/km*	*-0.20 dB/km*
Laser Type	*VCSEL*	*FP*	*DFB*	*DFB*

* SX Fiber Optic Cable
** LX Fiber Optic Cable

Connectors

10/100BaseTX:	Up to Twenty-four RJ-45 Copper Ports
100BaseFX:	Up to Sixteen SC or ST Fiber Ports
1000BaseSX/LXE:	Up to Two LC Duplex Ports

Recommended Wiring Clearance

Front:	4"	(10.16cm)
Side:	1"	(2.54cm)

Regulatory Approvals

FCC Part 15 Class A, UL Listed 1604 (US and Canada)
CLASS I, DIV 2, GROUPS A,B,C,D,T4A
CE: EN61000-6-2,4, EN55011, EN61000-4-2,3,4,5,6,
GOST-R Certified, RoHS Compliant, ABS Type Approval for Shipboard Applications, IEEE 1613 for Electric Utility Substations, and NEMA TS1/TS2 for Traffic Control

Contact Information

N-TRON Corp.
820 S. University Blvd., Suite 4E
Mobile, AL 36609
TEL: (251) 342-2164
FAX: (251) 342-6353
Website: www.n-tron.com
Email: N-TRON_Info@n-tron.com

N-TRON Europe GmbH
Alte Steinhauserstr 19
6330 Cham / Zg
Switzerland
TEL: +41 41 7406636
FAX: +41 41 7406637

REV 070307

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